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World Survey of Civil Aviation

CANADA 1970

BDSA

U.S. DEPARTMENT OF COMMERCE

Business and Defense Services Administration

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World Survey of Civil Aviation
CANADA

U.S. DEPARTMENT OF COMMERCE
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June 1970

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Foreword

This is the twelfth in a series of foreign market surveys of civil aircraft and aeronautical products. It includes an evaluation of the role of air transportation in Canada, with particular emphasis on fleet composition, flight operations, and marketing and investment opportunities. It also gives an extensive description of the Canadian areospace industry, the fourth largest in the free world, and of government support furnished the industry. The survey is designed to contribute marketing information which will enhance U.S. ability to maintain its position as worldwide leader in the aerospace industry.

William D. Lee
Administrator
Business and Defense Services Administration

June 1970

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Part 1. Air Transportation

Role of Air Transportation

With an area of 3.85 million square miles, Canada is almost 200,000 square miles larger than the United States. Her population, however, is 21.2 million, about one tenth that of the United States. Moreover, two thirds of Canada's population lives in southern Ontario and Quebec Provinces.

As a result, transportation is extremely important to the Canadian economy, and it is highly developed in all forms. Railroads, with over 44,000 miles of main tracks, play a large role, but they no longer occupy their former monopoly position. Water transport is widely utilized, although seasonally restricted by the cold winters. Roads are in good supply, particularly in the more populated sections, and overall there are approximately 450,000 miles of highways and rural roads in Canada. Many of the sparsely settled outlying areas, however, are virtually without roads of any kind. These areas rely heavily on air transportation, as do many ports of northern Canada which in winter can be reached only by air. Air transport, of course, plays an important role in the more populated areas of Canada.

In 1967 Canada's domestic airlines reported carrying 738,000 passengers (up 17 percent from 1966) over 321,000,000 passenger kilometers (up 15 percent from 1966), with a 48 percent load factor. Published 1969 data shows that Department of Transport (DOT) air traffic control towers recorded 4,312,102 movements, 263,878 more than 1967. Similar data on the 111 airports without towers show 1968 aircraft movements at 1,462,126, a 38.3 percent increase over 1967 when 105 airports handled 1,057,511 movements.

International air traffic entering and leaving Canada in 1967 showed an increase over 1966 of 40 percent in number of passengers and 11.1 percent in amount of freight carried. Canadian air carriers handled 47 percent of the passengers and 49 percent of the freight, as compared with 56 percent and 53 percent, respectively, the previous year.

International air traffic entering and leaving Canada on Canadian carriers in 1968 showed an increase over 1967 of only 1 percent in the number of passengers (2,393,924 vs. 2,370,018) but a 33.2 percent increase in the amount of freight tons carried (35,910 vs. 26,945). The small increase in number of passengers (1 percent versus 18 percent in 1967) is largely attributed to Air Canada's springtime strike.

Although there was a slowdown in growth in 1967, the importance of air cargo has increased steadily in recent years. But passenger traffic still holds an 84 percent to 16 percent revenue advantage. One of the major factors working against air cargo has been the imbalance of traffic. Much more cargo moves east and west from Toronto and Montreal than is received in return.

All airlines carry cargo on regularly scheduled passenger flights. In addition, Air Canada operates several DC-8's in all-cargo configuration on scheduled transcontinental and overseas flights. All-cargo Vanguards are also operated domestically. Pacific Western's Lockheed Hercules flies cargo charters almost the world over, and the airline also schedules DC-4 cargo flights from Edmonton to Fort McHenry, Fort Chipewyan, and Uranium City. Eastern Provincial operates all-cargo flights on two routes.

There are nearly 30,000 registered pilots in Canada (21,300 private, 7,562 commercial, and 1,082 glider). Flying training activity in 1967 increased 14 percent over 1966; 5,315 private pilots and 1,368 commercial pilots were trained to license standards.

Government Structure

Civil aviation is under the jurisdiction of the federal government. The Department of Transport (DOT) is responsible for the promotion and regulation of all Canadian civil aviation, both foreign and domestic, and for the provision of facilities in connection with civil operators. On February 17, 1970, the Minister of Finance announced the long proposed reorganization of DOT. Changes will include conversion of DOT into a ministry and creation of an air administration.

The Air Transport Board (ATB) was established in 1944 to advise the Department of Transport in matters pertaining to civil aviation and to license all commercial transports, subject to the approval of the Minister of Transport. Under the recently enacted National Transportation Act the ATB has become the Air Transport Committee (ATC) of the Canadian Transport Commission. The aim of this legislation is to blend all modes of government and private transportation, with more direct control allotted to the Minister of Transport. The committee, made up of five commissioners, was especially formed to help the industry to develop along sound economic lines that will give fair returns to the operator and adequate service to the public. The Canadian aviation industry has so far expressed some confusion regarding the legality of many of the ATC's rules and regulations.

Government Policy Toward Airlines

In 1966 the Canadian Government announced a new air transport policy that would allow for, among other things, limited regional carrier competition with Air Canada and Canadian Pacific, the transfer of some routes away from the two trunk carriers, and subsidies on a "use it or lose it" basis. The new policy allotted the regional carriers a larger role in connection with the development of domestic and international charter services, inclusive tours, and new types of services. Regionals are allowed to operate along the so-called main line, but without nonstop authority between major terminals. The Government would like to see closer cooperation among regionals, including interline and interticketing agreements, joint training programs, and spares support. The Government also announced that a committee would be established to develop greater cooperation between the mainline carriers and the regional carriers in a variety of fields ranging from technical and servicing arrangements to joint fare arrangements and other suitable areas of cooperation.

The airlines which are currently eligible for subsidies are Pacific Western Airlines, Transair, Nordair, Quebecair, and Eastern Provincial Airways. Continuation of any subsidy is dependent upon developing and maintaining an adequate volume of traffic. In reviewing applications for subsidies the Air Transport Board is to consider suitability and availability of other means of transportation; require evidence that the service has or will have substantial use; and set limits upon the period of time during which the subsidy may be paid, unless cause is shown for continuation. Steps are also to be taken to assist regional carriers in the acquisition of aircraft by development of a scheme for consultation between the Government and the carriers regarding plans for new aircraft; and by a special investigation designed to explore the possibility of developing a joint approach to aircraft procurement on the part of the carriers. All carriers operating on regular routes are required to report to the Government proposals for multi-engine aircraft purchases before firm orders are placed. Subsidies are to be given only to enable the provision of the minimum equipment for eligible air services and not to enable the carrier to re-equip needlessly at the public expense. The Government reportedly will use Air Canada's profits to finance the new subsidies for regional airlines.

Unfortunately, the Canadian aviation industry is experiencing a great deal of confusion regarding the Government's new policy. There has been little implementation of previously enunciated policy governing the mainline and regional carriers. The record to date shows no new competition, no transfer of routes, and discontinuance of the only subsidy payments made.

Historically, the Government's policy on scheduled international services has been that they should serve the Canadian interest as a whole and represent a single integrated plan. Only Air Canada and Canadian Pacific Airlines have the right to provide international and transborder services, and each has been given its own sphere of operations. Air Canada serves the United Kingdom, northern Europe (except Amsterdam,

which is served by CPA) and the Caribbean. Canadian Pacific serves the Pacific, Asia, Australia, New Zealand, southern Europe, and Latin America. The United States, served by both airlines, and Africa, presently served by neither, are exempted from these spheres.

Air Canada and CPA will continue to be the only carriers to provide transcontinental service. During 1967 Canadian Pacific was permitted to inaugurate its second transcontinental service, and in 1969 increased it to five round trips daily. This brought CPA's share of the total market near the 25 percent granted in the Government formula for transcontinental service. The Government's policy has been that Canadian Pacific's mainline service should not be allowed to compromise or seriously injure the economic viability of Air Canada's operations, but that above this basic minimum both Air Canada and CPA should be given an opportunity for growth.

Aircraft on Register

Among free world countries, the Canadian civil aviation fleet is second in size only to that of the United States. As of September 1969 there were 10,591 civil aircraft on register, 3,113 of which were commercial aircraft. There are also 6,709 private aircraft, 200 state owned, 18 experimental, 91 restricted commercial, 428 ultra light, and 32 private restricted aircraft. (See table 1.)

Commercial Air Services

The two major Canadian airlines are Air Canada, a subsidiary of the Government-owned Canadian National Railways, and Canadian Pacific Airlines (CPA), a wholly owned subsidiary of the privately financed Canadian Pacific Railways. In addition, there are four privately owned regional carriers providing scheduled (class 1) air service. They are Eastern Provincial Airways, Quebecair, Transair, and Pacific Western Airlines. There are also approximately 370 carriers which provide regular, irregular, charter, contract, and specialty services (classes 2-7). The new Federal Government review of airline policy issued during late 1968 has rekindled interest in a possible merger of Air Canada and CPA, but the view still exists that competition is necessary on domestic routes and to a limited extent on international runs.

Canadian air carriers transported 9.3 million revenue passengers in 1968, an increase of 3.8 percent over 1967, and 445 million pounds of revenue goods, an increase of 21.3 percent over the previous year. Revenue passenger miles performed increased 11.5 percent to 8.2 billion, and goods ton miles increased 32.8 percent to 226 million. Operating revenues were up 13 percent to $614 million,[1] while operating expenses increased 11.6 percent to $576 million. (See table 2.) Approximately 90 percent of the operating revenues and expenses were accounted for

[1] Dollar amounts are in Canadian dollars throughout unless noted.

by the six scheduled airlines, which also carried over 90 percent of the passengers and 66 percent of the cargo. Bulk traffic, or charter revenues, totaled $70.1 million, a 21.8 percent increase over 1967.

The 51 carriers operating helicopters during 1968 flew an estimated 160,000 revenue hours and had operating revenues of $18,614,000.

The group V [2] carriers transported 216,660 revenue passengers and 7,708 tons of goods in 1967, showing decreases of 3.1 percent and 5.2 percent respectively. Revenue hours flown were up 8.7 percent to 407,122.

Foreign carriers operating scheduled service in Canada transported 2,648,252 revenue passengers and 34,508 tons of revenue goods, up 69.6 percent and 20.8 percent respectively over 1966.

Air Canada

Air Canada, whose name was changed from Trans Canadian Airlines on January 1, 1965, serves approximately 61 communities in Canada, the United States, the British Isles, continental Europe, U.S.S.R., Bermuda, the Bahamas, and the Caribbean islands. It is the world's eighth largest carrier and the largest outside the United States and the U.S.S.R. (Under the proposed DOT reorganization announced on February 17, 1970, Air Canada would eventually become a separate crown corporation.) In 1967 Air Canada started operating Toronto/Montreal/Miami, Montreal/Chicago, and Toronto/Los Angeles services.

In 1968 the company carried 6,413,000 passengers on scheduled flights, an increase of 1.3 percent over 1967. Air freight increased 36.5 percent to 116,878,000 ton miles. Air express increased 16.3 percent to 7,878,000 ton miles, and air mail rose 6.3 percent to 22,811,000 ton miles.

Available seat miles on scheduled flights increased by 20.2 percent during 1968 to 9,683,835,000, while revenue passenger miles totaled 5,621,657,000, up 7.7 percent, making Air Canada seventh in the world in revenue passenger miles flown. System total ton miles amounted to 711,393,000, an increase of 11.5 percent.

Net income after tax in 1968 was $8,184,000 and return on investment 6.3 percent, compared with $3,547,000 and 5.2 percent in 1967. Operating revenues were up 12 percent to $387,628,000 and were split into passengers (85 percent), freight express and excess baggage (9 percent), mail (4 percent), and charter and incidentals (2 percent).

In 1968 Air Canada took delivery of three 139-passenger DC-8's and three 196-passenger long-body DC-8-61's, increasing its DC-8 fleet to 27 aircraft. Deliveries of 94-passenger DC-9 aircraft totaled 18 during the year, while six 72-passenger DC-9's were returned to McDonnell Douglas Corporation. Introduction of additional jet aircraft, especially the long-body DC-8's, resulted in larger capacity, and concurrently total load factor dropped from 75 percent to 58 percent.

The airline has started a program to retire its fleet of Vickers Viscount and Vanguard aircraft. Five of the airline's 23 Vanguards have been

[2] For a definition of the groups see the appendix.

removed from service and seven of 39 Viscounts have been retired. More of these aircraft will be removed from service in the years to come.

In 1968 Air Canada offered a major increase in its transatlantic service with 37 flights a week to the United Kingdom and 17 weekly to continental Europe. The airline is looking into the possibility of opening new routes from Toronto to San Francisco, Washington, Philadelphia, St. Louis, and Boston, as well as a route from Montreal to San Juan, Puerto Rico. Resumption of service to Brussels, Belgium, is planned and service to Prague, Czechoslovakia, under consideration. Air Canada is currently concentrating on expanding the volume of its air freight business. Frequency of all-cargo service has been increased sharply. The airline now offers all-cargo DC-8 service six times a week across the Atlantic and eight flights a week from Montreal to Vancouver.

In the fall of 1968 Air Canada entered an agreement with Air Jamaica to purchase 40 percent interest in a new airline—Air Jamaica Ltd. Air Canada will provide managerial and technical assistance to the new airline and assist with aircraft purchases and training of flight crews, reservation agents, and other technical people. The airline started service April 1, 1969, with one flight daily to New York and three daily between Jamaica and Miami.

Air Canada will continue to modernize its fleet of 108 jet and turboprop aircraft. The airline announced in early December 1968 it had signed a letter of intent with Lockheed Aircraft Corporation for purchase of ten 270-passenger L-1011 airbuses valued at US$161 million. The first six will be delivered in 1972 with three more scheduled for delivery in 1973 and the last one in 1974. It has been reported that Air Canada's concept is that by 1972 the L-1011's will do the work of the DC-8 fleet. Therefore, no more DC-8's will be bought after 1970. However, 8 DC-8-63's and 3 DC-9-32's were on order as of November 1969. In addition, the airline will receive three 368-passenger Boeing 747 jumbo jets in 1971, and has options to purchase four of the Anglo-French Concorde supersonics when they are available for service. For late in the 1970's the airline has taken options on six of the U.S. SST's currently being developed by the Boeing Aircraft Company. Options are also held for nine additional L-1011's.

Canadian Pacific Airlines

Canadian Pacific Airlines (CPA), one of Canada's three flag carriers, is the second largest Canadian airline. This wholly-owned subsidiary of Canadian Pacific Railways was created in 1942 with the amalgamation of ten small independent carriers, mostly "bush" operations.

The airline's present routes extend over 57,346 unduplicated statute miles. Of these, 50,464 miles are overseas routes, while the domestic route mileage of 6,882 miles includes 2,444 route miles on the transcontinental service inaugurated in 1959. Internationally, CPA services Hong Kong, Japan, Australia, Latin America, New Zealand, Fiji, southern Europe (terminating in Athens), and the United States, including Hawaii, where it operates two weekly nonstop flights from Toronto.

The airline hopes eventually to go to Yugoslavia and various Middle East nations, as well as to Bangkok via Hong Kong. Air charter service, halted in 1967 because of new aircraft delivery delays, is expected to be resumed.

During 1968 CPA achieved record operating revenues of $99.2 million, an 11 percent increase over the previous year. Declining yields and rising costs reduced net income, however, to $2.2 million in 1968 (down from $3.0 million in 1967 and $6.9 million in 1966). During the first 6 months of 1969 revenues totaled $63.2 million, up 31 percent over the same period in 1968. Passenger revenues rose 27 percent to $52 million and cargo increased 38 percent to $5.4 million. As with most other airlines CPA is faced with costs rising at almost the same rate as revenues.

Total passenger miles flown increased 107 percent in 1968 to 1.65 billion. Load factor dropped from 56.6 percent to 50.4 percent during the same period. Revenue ton miles rose 14.7 percent in 1968 to 210 million, while available ton miles increased 23.2 percent to 472 million. As of January 1968 CPA had 4,200 employees, and by 1971 anticipates having over 6,000.

CPA has an all U.S. fleet made up of ten DC-8's (used on international and transcontinental routes), including four DC-8-63 stretched jets; five DC-6's; three DC-3's; and seven 737's. Four Boeing 727 jet aircraft are on order, two for spring 1970 delivery. The airline holds three delivery positions for the Boeing 2707 supersonic transport and expects to order three or four more 737's. As of this writing there are no immediate plans for acquiring jumbo jets. Conversely, CPA is leasing one of its stretched DC-8's to another airline and is considering leasing a second in order to avoid the possibility of overcapacity for a while.

CPA has a $24 million maintenance and overhaul base at the new Vancouver International Airport. The maintenance facilities are designed to accommodate both jumbo and supersonic jets in addition to aircraft presently operated by the company.

Eastern Provincial Airlines

Eastern Provincial Airlines (EPA), based in Gander, Newfoundland, serves the five Atlantic provinces with scheduled, bush, and contract services. EPA, which merged with Maritime Central Airways in 1963, has been in financial difficulties for several years. In 1966 the carrier suspended some scheduled services and threatened further decreases if it did not receive direct subsidies. The Newfoundland provincial government, which has in the past guaranteed debentures issued by EPA, authorized a 25 percent subsidy on EPA fares between Newfoundland and Labrador, effective July 1, 1966. In 1967 EPA had a net deficit of $610,832. However, 1968 figures show EPA earning $76,000. In 1969 Nordair and EPA made an equipment pooling arrangement, but full acquisition of EPA by Nordair was postponed. The airline serves New Brunswick, Newfoundland, Nova Scotia, and other east coast areas.

EPA carried 138,377 passengers on 36.4 million revenue passenger

miles during 1968, an increase of 25.8 and 34.3 percent respectively over 1967. Ton miles reported were 2.8 million in both 1967 and 1968. Total operating revenues in 1968 were $9.1 million, an increase of 24.6 percent over the previous year.

EPA employs 475 people and has a fleet of four DC-3's, one DC-4, three Heralds, six DHC-3's, five DHC-2's, five Beavers, one Turbo Beaver, five Otters, five Cansos, one Baron, two Super Cubs, three Sikorsky S'55's, and two Convairs.

Pacific Western Airlines

Pacific Western Airlines (PWA), based in Vancouver, is the largest regional airline and the third largest airline in Canada. PWA serves western and northwestern Canada on a scheduled and charter basis and makes international charter flights to the Caribbean and Europe. Charter flights alone carried over 11,000 passengers during 1967. One of PWA's most successful operations is its airbus service between Edmonton and Calgary. More than 430,000 passengers have been flown between the two centers since the service was inaugurated in 1963.

In 1968 Pacific Western carried 427,000 passengers, an increase of 17.5 percent over 1967, and flew 225 million passenger miles. The volume of goods carried rose 154 percent to 31 million pounds, and ton miles flown increased 66 percent to 10.3 million. Reflecting the additional costs involved in the transition from piston to jet aircraft, net earnings dropped 55.7 percent to $284,706 while total revenue climbed 20 percent to $18 million. Figures published for the first half of 1969 show PWA having a very good year with gross revenues in the first half up 83 percent to almost $15 million. Pacific Western's fleet consists of one Lockheed Hercules, four Convair 640's, one DC-7C, two DC-6B's, two DC-6's, two DC-4's, three Super 46's, two DC-3's, three Grumman Goose, seven Beavers, two Otters, one Beech 18, one Apache, three Cessna 180's, one 707-138B, two 737-200's (one leased), and one 737-200C. One 737-200 is on order for 1970 delivery.

Quebecair

Quebecair was started in 1946 as Rimouski Aviation Syndicate, to link the towns on both sides of the St. Lawrence River east of Quebec City. In 1947 the name was changed to Rimouski Airlines, and in 1953, when it merged with Gulf Aviation, it took the name of Quebecair. The line acquired Northern Wings, Northern Wings Helicopters, and Matane Air Services in 1965. The airline's aggressive acquisition policy over the years has given it a large number of service points along the St. Lawrence River.

New route acquisitions and an updated fleet have not yet brought Quebecair out of the red. In 1968 Quebecair had a $1.4 million deficit on revenues of $6.3 million. A Federal subsidy reduced the final loss to $630,000. This compared with a 1967 loss of $585,000, after subsidy, on revenues of $5.5 million.

During 1968 Quebecair carried 189,264 passengers (185,481 in 1967) 55.6 million (50.9 in 1967) passenger miles and transported 4.4 million (4.1 in 1967) pounds of goods 818,326 (720,764 in 1967) ton miles.

Scheduled and nonscheduled services between the principal cities of Quebec and Labrador, including charter and contract jobs, are offered by Quebecair. New routes are planned from Montreal to Gaspé via Quebec City, Edmundston, and Bathurst. The Government recently assigned to Quebecair all of the province of Quebec east of Montreal. Quebecair operates two BAC-111's, three F-27's, one Beech 18, and five DC-3 aircraft in addition to the 26 various aircraft belonging to the three recently acquired subsidiaries. This fleet includes a Cessna 185, Bell G-47-4 helicopter, DC-3, Canso PBY flying boat, Curtis C-46, Lockheed 10, DeHavilland Otter and Beaver, and other aircraft.

The airline employs 400 people and owns the two-story airport terminal at Rimouski.

Transair

Transair, based in Winnipeg and Churchill, provides scheduled services in western and northwestern Canada and has applied for a Winnipeg-Toronto route with intermediate stops. The company also does a substantial amount of contract and charter work and operates the vertical resupply airlift to the main sites in the Canadian sector of the DEW Line. During 1967 Transair withdrew from its unprofitable transoceanic charter operations and disposed of its bush operations. The Government terminated, as of March 31, 1968, the temporary financial assistance it had been providing to Transair's prairie services since April 1966. However, the company decided to continue this service without Federal aid. Transair wishes to be in position to take advantage of traffic resulting from the heavy mineral exploration and exploitation in the north and will institute a prepaid accommodation program. Transair bought out Midwest Airlines Ltd. in 1969.

The company flew 138,135 passengers on scheduled mainline services during 1968, a 16.1 percent increase over 1967, and flew 57.9 million passenger miles, a 24.5 percent increase over the previous year. During the same period 8.9 million (8.2 million in 1967) pounds of goods were flown 3.38 million (3.34 million in 1967) ton miles. A net loss of $760,000 ($185,000 in 1967) was recorded for the year on revenues of $6,250,000 ($5,500,000 in 1967). Federal subsidies dropped from $311,000 in 1967 to $80,000 in 1968.

Transair's fleet consists of one Vickers Viscount, one DC-7C, four DC-4's, six DC-3's, two YS-11's, and two leased Hawker Siddeley 748 twin turboprop aircraft.

The company just recently received the two jetprop Japanese YS-11's, valued at U.S. $5.5 million, including spare parts and supporting ground equipment. The new airplanes are in service in northern Manitoba and northwestern Ontario. The leased HS 748 aircraft will be used to meet the demands of the sharply increased air traffic over the company's main line routes. Two Boeing 737-200C aircraft are on order.

Nordair Ltd.

Nordair Ltd. was established in 1957 by the merger of Mont Laurier Aviation and Boreal Airways, and in spring 1969 the airline entered an equipment pooling agreement with Eastern Provincial Airlines (EPA). However, acquisition of EPA has been postponed. Scheduled services are offered from Montreal to Roberval, Great Whale, and Fort Chimo in Quebec, and to Frobisher, Hall Beach, and Resolute Bay in the Northwest Territories. When necessary charter flights are operated with ski-equipped DC-3's. Transatlantic reconnaissance and geodetic survey work is undertaken.

Nordair has had a consistent profit record. In 1968 net profit after deferred taxes was about $225,000 on revenue of $6.7 million, up about 11 percent over 1967. Profit was higher in 1967, about $750,000, because of certain tax adjustments.

In December 1968 Nordair became the first airline to operate regular scheduled jet service into the Canadian Arctic. Nordair uses its new specially equipped Boeing 737 airplanes certified for use on gravel or unimproved runways. Short-haul routes are now served by a subsidiary, Nordair Arctic, Ltd., using DC-3's, Curtis C-46's, and a DeHavilland DHC-6-300 Twin Otter. The EPA equipment pool gives Nordair a wider base for utilization of its jets and offers EPA early introduction of jet service on its routes.

Nordair employs 350 people and has a fleet of three Lockheed L-1049 H Super Constellations, three DC-3's, three DC-4's, four C-46's, and two Boeing 737-242C's. The airline is selling the DC-4's and L-1049's, and leasing two additional 737's. One Boeing 737 is on order. Eventually the company plans to standardize the fleet to 737's and Twin Otters.

Wardair Canada Ltd.

Maxwell Ward founded the Polaris Charter Company, a bush operation, in 1946, to fly charters in support of the rapidly developing mining industry of the Northwest Territories. Wardair was formed in 1952 to continue this work and today has expanded its operations to include surveying, domestic and international charters, and regular services to communities like Yellowknife, Uranium City, and Coppermine. In 1968 this supplemental airline carried 32,000 passengers and forecast 60,000 for 1969.

The company's fleet consists of one DC-6B, one Boeing 727, four Bristol 170 MK-31's, two Otters, one Beaver, one DHC-6, two Twin Otters, and two Boeing 707-320C's.

Great Northern Airways Ltd.

Great Northern Airways Ltd. is a nonscheduled operator offering various types of charter service from Calgary and six other bases in northern Canada. In 1967 the company received approval to operate charters between Canada and the United States. The airline's fleet is

comprised of four DC-3's, three Aztecs, one Otter, two Fairchild F-27J's, five Beavers, and three Cessna 180's.

Midwest Aviation Ltd.

Midwest Aviation Ltd., incorporated in 1957 as a charter operation, now offers charter services throughout Canada and the United States, as well as a scheduled route to northern Manitoba. The company has applied to operate third level services between Winnipeg, Brandon, Yorkton, and Regina. The fleet is comprised of one HS748, one DC-3, one Twin Otter, one PA-31 Navajo, three Aztecs, one Cherokee Arrow, one Super Cub, one Cessna 185, one S-55, ten Bell 47G's, one Jet Ranger, and one Bell 205A.

Other Airlines

Among the smaller Canadian airlines are Air Gaspé Inc., Airwest Airlines Ltd., B.C. Airlines Ltd., Cavalier, Eldorado Aviation Ltd., A. Fecteau Transport Aerien Limitée, Gagnon Air Services Ltd., Georgian Bay Airways Ltd., Gordon Airways Ltd., Great Lakes Air Services Ltd., Laurentian Air Services Ltd., Matane Air Services Ltd., North Canada Air Ltd. (Norcan Air), Northern Wings Ltd. (Les Ailes du Nord), Northward Aviation Ltd., and Parsons Airwings Ltd.

General Aviation

The Canadian Department of Transport (DOT) defines civil aviation as all flying performed by civil aircraft other than route operations of scheduled carriers. General aviation thus includes the nonroute services of scheduled carriers, all other commercial flying, private and business flying, and flying performed by nonmilitary government aircraft. Over 70 percent of the 10,591 aircraft on register as of September 30, 1969, were noncommercial. However, the average utilization of general aviation is quite low. In 1968 an estimated 700,000 hours were flown by private flying, a 97,000 hour increase over 1967.

General aviation in Canada has been limited by the one problem aviation normally solves—distance. The advent of the business jet, however, has eased the time and comfort considerations of the long distance commuting businessman. Owned and leased corporate aircraft are increasingly supplementing their workhorse piston-powered predecessors. The growth of advanced flying also reflects the trend toward more sophisticated equipment. Even the famous bush operator is requiring more specialized airplanes for his operations.

Nonscheduled Transport and Specialty Services

Nonscheduled and specialty services is a highly competitive field. In 1968 there were over 315 Canadian carriers licensed to perform all types of nonscheduled services. Specialty flying services are those activ-

ities which are largely for purposes other than transportation, such as aerial work and recreational flying. Aerial crop spraying, forest reseeding, and water bombing of forest fires are fast growing industries in Canada. Another 300 aircraft were used for other agricultural purposes. In the spring of 1966 the Government established a special committee to investigate ways of improving aircraft, equipment, and techniques used in aerial spraying and for general agricultural purposes. In 1967 Canadian carriers flew 545,203 hours in specialty service operations, a 20 percent increase over 1966, and earned $19,499,000, or 24 percent more than the previous year. More than half the hours flown in specialty services are by operators having gross annual flying revenues of less than $100,000. Table 3 gives a complete breakdown of specialty service utilization and revenues.

The larger Canadian carriers which provide only charter services include: 1) Fecteau Transport Aerien Limitée, which performs charter and contract bush services throughout Quebec; 2) Nordair Ltd., which operates from Montreal to communities in Quebec and the Northwest Territories; 3) B.C. Airlines Ltd., which provides charter and regular service along the coast of British Columbia; 4) Austin Airways Ltd., based on Toronto Island, which provides charter and specialty services including aerial surveys and forest fire patrols in Ontario, Quebec, Manitoba, and the Northwest Territories. Several of the nonscheduled carriers, including Wardair and Nordair, make international charter flights.

The nonscheduled carriers operate over 1,800 aircraft. Well over half of these are single or twin-engined planes weighing 5,000 pounds or under. Wardair, which uses a Boeing 727 and two 707-320's, was the first Canadian nonscheduled operator to acquire a jet. Nordair recently introduced the first scheduled jet service north of the Arctic Circle. The airline has acquired two Boeing 737-242-CQC aircraft specially modified for gravel and unimproved runways.

Helicopter Operators

There are no scheduled helicopter services in Canada. A study by the Department of Transport concluded that scheduled or regular helicopter service on a self-sustaining basis is not yet feasible in Canada. The report added, however, that the feasibility of introducing such service should be recognized in the future.

Helicopters are used to provide nonscheduled cargo transport and to perform specialty services, primarily aerial patrol and inspection, aerial photography, and geophysical survey.

Although there are no scheduled helicopter services, in 1968 there were 51 carriers operating 344 owned and/or leased helicopters, as compared to 53 carriers in 1967 having 330 rotor wing aircraft. In 1968 these carriers flew an estimated 160,000 revenue helicopter hours, 125,000 of which was for bulk flying and 35,000 for specialty flying. This compares to 157,832 helicopter revenue hours in 1967, of which 124,120 were for bulk flying and the remainder for specialty flying. Helicopter operating revenues increased from $16,780,000 in 1967 to $18,614,000 in 1968.

Private Flying

In the past few years private flying has increased more rapidly than commercial aviation and this trend is expected to continue. As of September 1969 there were 6,709 private aircraft registered in Canada, 5,406 of which had valid certificates of airworthiness. The percentage of private aircraft in the total fleet has risen from 40 percent in 1951 to over 63 percent in 1968. At the end of 1967 there were 21,089 licensed private pilots. In 1969 an estimated 700,000 hours were flown by the private sector; 603,000 were flown in 1967. All indications are that business aviation is at an all time high and that more and more business airplanes are being sold, chartered, or leased. In 1968 Canadian companies owned approximately 1,000 aircraft of a type or size normally operated in business/executive configurations, including 20 business jets. This was an increase of 240 over the 1967 fleet.

Government Support of General Aviation

While the Federal Government has no national program designed exclusively to support general aviation, general aviation benefits from Government support of aeronautical facilities and services, particularly airports. In addition, the DOT administers a program of assistance for flying training which primarily benefits general aviation. Charges for general aviation are kept low and revenues from general aviation represent only a small part of the services from which general aviation aircraft benefit. All civil airports, other than a very small number of private airports, are available for use by general aviation. However, at the largest scheduled carrier airports, beginning flying training is not permitted, and a special landing fee is charged at the three largest airports for small privately-registered aircraft, which may land elsewhere without charge.

The Government does not offer subsidies to any nonscheduled carriers. The Government policy on licensing charter operators has changed several times in the past ten years: in 1958 the Government adopted a liberal policy of granting licenses; in 1962 the increased controls were reinstated; in early 1966 the Government again liberalized its policy on granting licenses.

Airports

Canada has 342 licensed land airports, 34 licensed heliports, and 385 licensed water airports. In addition there are 540 unlicensed land airports, 244 unlicensed water airports, and 57 military airports. The Department of Transport is responsible for the construction and operation of the airports served by scheduled airlines, execpt for several which are run by municipalities. Though DOT also operates some smaller airports, they are generally operated by municipal or private authorities. The

Federal Government recently liberalized its policy of granting capital assistance for the construction of smaller airports. The Government proportion of aid is no longer limited to 50 percent but will be decided on a case to case basis. The requirement that airports had to have runways large enough to accommodate DC-3's in order to qualify for DOT aid was also lifted.

Canada continues to expand and improve its airport facilities. A projected $2 billion has been earmarked for new airport construction, equipment, and support facilities over the next few years. Master plan studies are underway for major airports in order to insure their development in line with future air commerce needs. Vancouver International Airport's new $30 million terminal facilities are reportedly the most modern in Canada. The DOT says the terminal is expected to meet its needs for at least 8 to 10 years. Some critics question this claim in light of the advent of the jumbo jets and their concomitant demands. The airport facilities at Toronto and Montreal are soon to undergo major expansion. The DOT has launched a $10 million improvement program at Dorval to enable the airport to accommodate large body transports until the new Ste. Scholastique airport opens in 1974.

Calgary airport has started expansion under the DOT plan announced in mid 1968, which indicated that the facility would undergo interim improvement amounting to $2.4 million. St. Scholastique, north of metropolitan Montreal, has been selected as the site of a second airport. This facility will supplement transcontinental and intercontinental services now available at Montreal. It is expected to cost $400 million and will take three years to build. Decisions on other major airport improvements are expected in the near future, including plans for a second Toronto airport.

The Department of Transport Committee reports that during 1968 aircraft movements at 111 airports without towers across Canada were 1,462,126, a 38.3 percent increase from 1967 when 105 airports handled 1,057,511 movements. Locals (flying training) recorded 1,107,827 movements, 39.8 percent more than in 1967, when 792,515 were reported. Itinerant movements amounted to 354,299, a rise of 33.7 percent over the 264,996 reported in 1967.

Preliminary figures for 1968 aircraft activity at the 42 airports with DOT control towers show 4,036,335 movements, compared with 3,037,749 in 1967. The itinerant class gained 50,467 movements against a loss of 51,824 for the locals. Simulated approaches retained their 1967 level of 114,424 movements.

Market Potential

Although Canada ranks fifth in the world in dollar volume of aviation and aerospace production, almost 80 percent of the registered civilian commercial aircraft in Canada are U.S. made (see table 4), and there is no indication that U.S. predominance will decrease in the years ahead. In 1967 the U.S. share of the Canadian aircraft market reached a high of 92 percent.

Air Canada, the major purchaser of U.S. aircraft equipment, probably will need 15 to 20 of the Boeing 747 jumbo jets during the 1970's. The airline plans to spend more than $1 billion over the next decade on new equipment and facilities. The latter will include such extensive aircraft service facilities expansion as hangars, maintenance shops, and other services to deal with the new generation of jumbo jets. U.S. suppliers and contractors would do well to compete on these large projects.

Canadian Pacific Airlines will need additional aircraft of the Boeing 727 and 737 or DC-9 variety by the late 1970's; its airbus acquisitions will probably not come about before 1972, with an initial purchase of two. Nordair has its third Boeing 737 on order and eventually plans to standardize its fleet to 737's and Twin Otters. Transair has two 737-200C's on order, and Pacific Western expects its fourth 737 in 1970. Both CPA and Air Canada have options on a total of nine U.S. Boeing SST's expected in the late seventies. PWA, already an enthusiastic Boeing 737 user, has considerable growth potential both in terms of its existing routes and those it could eventually expect to take over from Air Canada and CPA.

Regional carriers are being encouraged to apply for more of the transborder routes now being served by U.S. local service carriers. If the regionals do explore this channel, they will require aircraft having about a 50 seat capacity, as opposed to their present 100 seat capacity equipment. Conversely, the Federal Government maintains an interest in acquiring larger jets for its Department of Transport.

The 370 other carriers of various specialties will continue to be in the market for smaller aircraft to supplement their current fleets. Before committing itself to an equipment program, Canada lets it be known that joint production, subcontracting, and other sharing arrangements are expected from the manufacturer. The Government in turn offers several attractive inducements, such as development land grants, to encourage foreign firms.

Canadian airport expansion and improvement plans costing millions of dollars are already underway throughout the country and will continue over the decade. Not all terminal facilities can be furnished by in-country suppliers, however, thereby leaving room for U.S. participation.

General aviation, especially private flying, is rapidly increasing throughout Canada. Business airplanes are finding a ready market either through direct purchase or charters and leases.

Part 2. Aerospace Industry

General Industrial Picture

The Canadian aerospace industry is the fourth largest in the free world, after the United States, the United Kingdom, and France. There are over 100 companies involved in the manufacture of aircraft, aircraft equipment and parts, and related electronic components and equipment. Eighty percent of the industry is located in Ontario and Quebec. It is represented by the Air Industries Association of Canada. The two major producers of aircraft are DeHavilland of Canada and Canadair. There are also several smaller companies, including the Avian Aircraft Company and the Maranda Aircraft Company. The A. V. Roe Company became Hawker Siddeley of Canada in 1962. Its Avro aircraft division was bought out by DeHavilland in the same year. Douglas Aircraft Company of Canada, a subsidiary of McDonnell Douglas, has been engaged in the production of wings for the DC-9 since the end of 1965 and is now preparing facilities for DC-10 wing structure production. The Boeing Aircraft Company also has a subsidiary in Canada which engages in limited helicopter production and plans to build a US$5.5 million plant to make fiber glass components for its aircraft. Both Hughes Tool Company and Fairchild Hiller Corporation have plans to produce their light observation helicopters (LOH) in Canada if the Canadian Defense Ministry selects one of the designs in its present LOH competition.

The companies which produce engines are United Aircraft of Canada and Orenda Ltd., which is owned jointly by Hawker Siddeley of Canada (60 percent) and United Aircraft of Connecticut (40 percent). Rolls Royce of Canada handles the overhaul of all Rolls engines in North America, but it does not produce complete engines.

Canada began development of the Avro Arrow, a supersonic interceptor for the Royal Canadian Air Force, in the 1950's. The project was abruptly terminated in 1958 when the Government decided that it was too costly. The Avro Arrow was replaced by the U.S. designed and produced BOMARC missile and SAGE control equipment. Over 13,000

people were instantly dismissed and a total of 300,000 were ultimately affected. The gross value of production of the Canadian aerospace industry, including components and electronics, fell from $505 million in 1958 to $362 million in 1959 and to a low of $353 million in 1960. It seemed that the industry might disintegrate. However, the value of production increased by almost $50 million in 1961 due to Canadian Government orders for CF-104 fighters and CL-41 trainers and increased steadily until 1964 when it reached $588 million dollars. In 1965 the gross value of production dropped to $541 million due to a cutback in Canadian defense procurement.

Production grew again in 1966, reaching a gross value of $594 million that year, and $660 million the following year. The growth trend has been steady with $750 million in gross value of production reported for 1968 and $430 million for the first half of 1969.

Until 1967 Canadian imports and exports of aircraft, engines, parts, etc., had been fairly evenly balanced. Now the industry is developing a broader base. This is credited to the greatly increased scope of U.S. jetliner parts production at Douglas of Canada, together with DeHavilland of Canada's Twin Otter sales and United Aircraft of Canada's PT6 turbine exports. In 1968 Canada sold $559 million worth (75 percent) of its aerospace hardware abroad. For the first 6 months of 1969, exports represented 58 percent of the industry's $430 million in sales.

Aerospace employment rose 5 percent in 1967, from 45,900 to 48,100. During the first half of 1969 employment leveled off at 50,000. New capital invested in the industry remained at $26.7 million in 1967, but dropped to $9.6 million during the first half of 1968.

While the aerospace industry is producing and developing a number of small, Canadian-designed civilian aircraft and the PT-6 and the JT-15D engines, the industry has come to rely increasingly on the production of military aircraft and engines under license and the production of parts and components. Work performed under subcontract to major U.S. aircraft manufacturers, both civil and military, comprises a large proportion of total dollar production. The Government offers many attractive inducements to manufacturers willing to subcontract in Canada, including remission of custom duties for tooling, jigs, etc., in connection with specific programs. The amount has increased considerably since the airbus manufacturers began awarding subcontracts. United Aircraft of Canada has a $20 million contract to supply auxiliary engines for pneumatic and air-conditioning systems in the Lockheed L-1011. Douglas of Canada's DC-10 wing structures will represent 15 percent of the DC-10 manufacturing effort. Lockheed Corporation, as part of its L-1011 sales package with Air Canada, will subcontract between $50 and $70 million of work to Canadian firms. Numerous other subcontracts have been awarded to Canadian firms for nose and wheel landing gear, components, etc.

Under license from Lockheed, Canada produced 240 CF-140's for its own use and 140 F-104's for a joint U.S./Canada Military Assistance Program. Canadair produced the Mark 44 torpedo under a General Electric license and is currently producing a $215 million CF-5 program

under license from Northrop. This program involves a U.S. input of more than 30 percent on a program basis. Canada has also been a good customer of the United States in terms of direct purchases. These have included the M-109 155mm self-propelled howitzer, CHSS-2 ASW helicopters (assembled in Canada), about 1,200 M-113 armored personnel carriers, and 24 C-130 transport aircraft.

In addition, many U.S. companies have subsidiaries in Canada. Examples are Douglas of Canada, a subsidiary of McDonnell Douglas; Canadair, owned by General Dynamics; United Aircraft of Canada, Ltd., which handles all of United Aircraft's piston engine work worldwide; RCA, which provides plasma physics research for the U.S. Department of Defense and NASA; and Litton (Canada) Ltd., which provides inertial platforms for U.S. aircraft guidance systems.

Individual companies have tended to diversify and are trying to reduce their reliance on Canadian Government orders and push harder into foreign markets. Canadair, for example, was almost wholly dependent on the Canadian Government until 1962. In 1966 more than 50 percent of its orders came from other sources and this percentage is continuing to grow. Canadair has diversified into the manufacture of Dynatiac, a tracked articulated utility army vehicle, architectural curtain wall components, buses, and the CL-89 reconnaissance system. Other companies have followed similar patterns.

Canada recently considered participating in the development and production of a multipurpose aircraft in conjunction with a European consortium. This idea was eventually dropped.

When the Avro Arrow project was canceled, the Canadian Government entered into a Production Sharing Agreement with the United States. The agreement is designed to provide Canadian manufacturers with competitive access to the U.S. defense market so that Canada can balance its defense expenditures in the United States. Cross-border procurement has averaged US$388 million per year each way during the period 1959 through March 1969. To date, the United States has spent over US$437 million more in Canada than Canada has in the United States. Projections of cross-border spending show an estimated increase in annual spending of 50 to 75 percent over past averages.

Government Support

The Department of Defense Production, established in 1951 to centralize procurement for defense forces, became part of the Department of Supply and Services in 1969. One of its principal responsibilities is to encourage Canadian development and production of defense equipment. The Department of Industry, established in 1963, had an aircraft branch as one of its ten operational branches. It is also now part of the new department. Its functions are to help manufacturing industries adapt to changing conditions, assist industries that require special measures to develop an unrealized potential, and to promote the development and use of modern industrial technology.

Although the Canadian Government does not directly subsidize aircraft production, the above new departments, like their predecessors, do sponsor a number of programs which provide grants and loans for research and development. Most of this aid has been given to defense-related projects. However, in 1965 the Government introduced a program to assist civilian projects exclusively (Program for Advancement of Industrial Technology) and recently stated that in the future the Government will give full consideration to support of defense development projects on the basis of initial civil markets. Under these programs the Government contributed to the aerospace industry a total of $20.6 million in Fiscal Year 1963-64 (April 1-March 31), $23.1 million in 1964-65, and an estimated $23.5 million in 1965-66. During calendar year 1967 the aerospace industry received $18.8 million for research and development from the Government. An account of industry repayment is not available. Airplanes which have been developed with aid of Government funds include Canadair's CL-84 tilt-wing VTOL, DeHavilland's DHC-5 Buffalo, Found's FBA-2C utility freighter, and Avian's 2/180 autogyro. DeHavilland's DHC-4 Buffalo was developed with the aid of the Canadian Government and the U.S. Army.

The Government also provides indirect aid to the aerospace industry through a tax incentive which encourages research and through its program of encouraging exports. Duty-free entry of aircraft and engine components of a type and size not made in Canada also provides indirect aid.

Defense Industry Productivity Program

The Defense Industry Productivity Program combines the former Industry Modernization for Defense Exports Program and the Defense Development Sharing Program.

The program is designed to enhance the technological competence of the Canadian defense industry in its export activities by providing financial assistance to industrial firms for selected projects. Assistance may cover the development of products for both military and para-military export purposes; the acquisition of modern machine tools and other advanced manufacturing equipment to meet exacting military standards; and assistance with pre-production expenses to establish manufacturing sources in Canada for military or para-military export markets.

Projects initiated under this program have played a major role in helping industry to develop its skills on a specialized basis in fields of technology which have defense and often civil applications, and which Canada is favorably situated to exploit. Costs of these projects are shared by the Department of Supply and Services and the Canadian firm concerned and, in some instances, by the governments of other NATO countries. Among the projects that have received assistance are communications and aircraft navigation systems, gas turbine engines for aircraft, flight safety and simulation equipment, and information display facilities. Exports of the products of these developments continue to increase, including significant orders for such diverse applications as commercial

airlines, public communication networks, and television distribution systems.

The Department is currently spending about $32 million annually under this program to support 142 projects.

Since the start of this program (i.e., the previous individual programs making up the new combined program), 165 projects involving an expenditure of $148 million have been supported. Of these some 120 have been completed and Government contributions have amounted to $99 million. The value of sales to date resulting from these projects is $995 million.

General Adjustment Assistance Board

This board was instituted to help Canadian companies take advantage of Kennedy Round tariff reductions in overseas markets. It will insure up to 90 percent of a readjustment loan that a manufacturer gets from a private financial institution, and is empowered to make direct loans in unusual or exceptional cases where firms are unable to obtain an insured loan. The board will also help locate and pay up to 50 percent of the cost of consulting services for smaller companies unable to develop their own adjustment proposals.

Program for Advancement of Industrial Technology (PAIT)

The aim of this program, which became effective in 1965, is to advance the technological capability of Canadian manufacturing industry by supporting selected civil (nondefense) development projects which involve a significant technical advance and which offer good commercial prospects. Costs of the projects are shared equally by the Government and the firm. If the project is successful and results in commercial production, the firm is required to repay the Government's contribution with interest. If the project is not successful, the firm does not have to repay the contribution, but the Government has the right to take title to the results of the project. Since its inception, 175 projects have been supported under this program, to which PAIT will eventually contribute $26.1 million. The Government has budgeted $16 million under PAIT for FY 1970.

Defense Industrial Research Program

The primary objective of this program, approved in 1961, is enhancement of Canadian industry's ability to participate in the development and supply of defense equipment. Companies are expected to pay half

the cost of research projects, but particular cases may require different cost sharing ratios. Repayment of the Government contribution is not required. It is recognized that the research may not lead to the production of a specific product. Most of the funds have been applied to research in electronics, power engineering, aeronautics, and materials.

Incentive for Research and Development

For income tax calculations, deduction of all research and development expenditures incurred during the year has been permitted since 1961. In 1962 manufacturers were given an additional deductible allowance of 50 percent of the amount by which a corporation's expenditures on scientific research exceeded the 1961 base year expenditures on research and development. This additional allowance was canceled in 1966.

Export Promotion

In line with an export drive launched in 1963, the Department of Trade and Commerce sponsors Canadian trade missions, trade fairs, and product demonstrations abroad, as well as visits to Canada of potential purchasers. The Department also assists exporters to bring foreign technical personnel to Canada for training or for evaluation of Canadian products and capabilities, and, when appropriate, to send industry personnel abroad to give on-site instruction. In addition, the Export Development Corporation gives assistance to exporters by insuring extended-term financing. Some provincial governments also occasionally sponsor trade missions.

Both Government and industry have been intensively marketing the Canadian-designed airport export program and see it as a prosperous market for Canadian businessmen. Since the program's inception two years ago, Canadian exports of airport equipment have gone from almost zero to about $40 million.

Avian

The Avian Aircraft Company was founded in 1959 to develop the Avian 2/180 autogyro. The 2/180, powered by a 200 hp. Lycoming fuel injection engine, is designed to fill the gap between fixed wing STOL aircraft and helicopters. The gyroplane reportedly can do most of the things a helicopter can do, yet is not more difficult to fly than a conventional fixed-wing aircraft. It can fly as slowly as 30 m.p.h., cruise at 100 m.p.h., and reach 120 m.p.h. It seats two and can be adapted for three. Normal cruising range is 400 miles.

The company has built seven prototypes in all. The certification

prototype flew for the first time in November 1965, received a provisional Certificate of Airworthiness in April 1968, and full certification early in 1969. Avian is reportedly ready for production and already has orders for over 100 aircraft. The company reports that special-purpose versions will be developed for agricultural and military duties.

Found

Found Brothers Aviation Ltd., the producer of the Centennial 100 bush aircraft, was closed at the end of 1968 because of financial difficulties. At present the company is reportedly looking for a new source of financial support in order to resume production.

From 1964 to 1967 Found produced 34 FBA-2C five-seat cabin monoplanes powered by a Lycoming 250 hp. engine.

The Centennial 100 had received certification shortly before the company folded. It was similar to the FBA-2C but had a more powerful engine and was slightly larger. The prototype flew on April 7, 1967, for the first time. Provisional certification was granted in 1967 and full Department of Transportation certification in mid 1968. Ten aircraft were to be built initially and production was expected to reach four per month by June 1969. The company had planned to increase the engine power from 280 to 400 hp. The standard Canadian price, at 280 hp., was to be about $29,500, with skis, floats, wheel skis, and amphibious floats optional, and $35,000 with a 400 hp. engine.

Maranda

The Maranda Aircraft Company Ltd. is engaged in the development and manufacture of ultra-light aircraft. These airplanes are sold in both complete and kit form.

The company currently produces the Super Loiser BMI-A two seat cabin monoplane, the Hawk BM-4 two seat cabin monoplane, and the Lark BM-6 single seat sporting biplane. These are in addition to the original Maranda monoplanes: the Loiser RA14BM1, a two seat light cabin monoplane, and the BM-3 single seat agricultural monoplane.

Maranda has under development the Falcon BM-5 two seat light cabin monoplane, a new gyroplane, hydraulic disk brakes, and hydrofoils for small marine craft.

Orenda Ltd.

Orenda Engines Ltd. became a division of Hawker Siddeley of Canada in 1961. In September 1966 Orenda again became a separate company, known as Orenda Ltd. Hawker Siddeley owns 60 percent of the new company's stock, and the United Aircraft Corporation of Hartford, Connecticut, owns 40 percent.

Orenda produced the GE J-85-CAN-40 engine for the CL-41 and is now producing the J85-15 for the twin-engined CF-5. Orenda is the only producer of the "dash fifteen" version of the J85 and is producing the engines for the 115 to 125 CF-5's ordered by the Canadian Government and the 105 CF-5's ordered by the Dutch Government. Delivery began in 1967. Orenda also designs and manufactures industrial gas turbines, produces spares, and does repair work on J79-7, J-85-CAN-40, and Orenda turbojet engines, production of which ended in 1965.

Canadair

Canadair, a subsidiary of General Dynamics, has been developing and manufacturing commercial and military aircraft since 1944. Until recently Canadair was almost wholly dependent on Canadian Government orders. In 1962, however, the company decided to rely on defense contracts and began to diversify into the manufacture of a variety of non-aerospace products. Today less than 50 percent of its orders come from the Canadian Government and this percentage is expected to decline further. Total sales for 1965 amounted to $70 million. Current annual sales are running close to $175 million. Employment, which had been declining for many years, recently began to increase. It rose from 6,000 in 1966 to 9,000 in 1968.

Canadair is currently producing the CL-215 utility amphibian, and the CL-84 tilt wing VTOL aircraft under contract for the Canadian Air Force. The twin-engined CL-215, which can carry 12,000 pounds of water, is the only aircraft designed specifically for fire fighting. The plane has a variety of other uses and can be converted easily from its water bombing role to that of a 30 passenger or 7,800 pound freight aircraft for bush and other operations. The CL-215 has accumulated over 200 hours of flight time in a test program, and it received Department of Transportation certification on November 15, 1968. Thirty have been ordered to date and first deliveries began in early 1969. The company sees a potential market of 500 over the next 10 years. The CL-84, which is powered by two Lycoming T53 turboshaft engines, can fly at 300 m.p.h. like a conventional airplane and hover like a helicopter. Although the CL-84 was originally designed for military use, recent studies indicate that this type of aircraft should become economically feasible for commercial city-center to city-center airbus operations in the 1970's. Field evaluation of the VTOL aircraft began in April 1969. During 1966 Canadair completed its production run of 190 CL-41 Tutor jet trainers and is now producing a new tactical version: the CL-41-G with General Electric J-85-J4 engines. Twenty of these aircraft have been delivered to the Malaysian Air Force.

When an improved version of the Northrop F-5 was chosen as Canada's new tactical aircraft in 1965, Canadair got a defense contract to build 115 to 125 of them, to be designated CF-5. Canadair is now producing these airplanes, along with 105 in a modified version for the Royal Netherlands Air Force. Other countries have also expressed an interest in the CF-5, which has a more powerful engine and a shorter

takeoff run than Northrop's F-5. Orenda of Canada is building the J-85-GE15 engine for the CF-5. Canadair is also extensively engaged in subcontract work for Lockheed on the C-5A transport and for General Dynamics on the F-111 variable sweep aircraft. In October 1969 Canadair announced its decision to cooperate with the German firm Vereinigte Flugtechnische Werke GmbH (VFW) for the development of propeller-driven tilt-wing V/STOL aircraft for civilian and military uses. Canadair is also active in the repair and overhaul of aircraft.

DeHavilland

The DeHavilland Aircraft Company of Canada is a subsidiary of the British DeHavilland Aircraft Company and a member of the Hawker Siddeley Group. Established in 1928, DeHavilland bought out the Avro Aircraft Division and the Canadian Applied Research Division of Hawker Siddeley in 1962. The bulk of DeHavilland's activity is devoted to the development and manufacture of a series of STOL utility and light transport aircraft. DeHavilland also designs, manufactures, and repairs a diversified range of products. In 1963 it received a Government contract to build and design a 200-ton hydrofoil ship for the Royal Canadian Navy. DeHavilland formerly produced all wing and tail assemblies for the DC-9; in December 1965 this work was taken over by Douglas of Canada.

Since 1947 DeHavilland has produced more than 3,000 aircraft, 80 percent of which, representing about $500 million in sales, have been exported. The company delivered a total of 119 aircraft in 1967, including 66 Twin Otters. Sales for that year amounted to $89 million, a 47% increase over the previous year's sales. Sales for the first 6 months of 1968 were $48.1 million, as compared to sales of $35.5 million for the same period in 1967. Over 300 Twin Otter orders have been received for customers throughout the world. After losing 4,700 employees to Douglas, DeHavilland built up its staff from 4,382 employees at the beginning of 1966 to a present level of over 5,000.

DeHavilland is currently producing the Turbo-Beaver, the Buffalo, and the Twin Otter. Since receipt of additional orders for the Caribou STOL military transport that production line has been reopened at the rate of one a month. The DHC-2MK. III Turbo-Beaver is powered by a single PT6A engine and carries up to 10 passengers or 1,800 pounds of cargo. Production began in 1965 and the current rate is four aircraft a month. Since there are over 1,000 standard Beavers currently in service, DeHavilland is considering the possibility of marketing a conversion kit to change a standard Beaver into a Turbo-Beaver. The DHC-4 Caribou, powered by two 1,450 hp. Pratt & Whitney engines, is available in military and civilian configurations. The civilian version carries 30 passengers, and the military 32 passengers, 26 fully equipped paratroopers, or 3 tons of cargo. Over 245 have been sold so far, including 159 to the U.S. Army.

The DHC-5 Buffalo is a turbine version of the Caribou and is powered by two GE T-64 turboprops. The military version accommodates 41

troops, 35 paratroopers, or 25 stretchers and 6 passengers. DeHavilland is currently producing two Buffalo a month with over 21 delivered out of 31 sold. The Canadian Defense Force bought 15 and the Brazilian Air Force 12.

The DHC-6 Twin Otter, which is probably DeHavilland's most promising sales prospect, was designed for feeder line service, air charter in remote areas, and short haul military transport. It is powered by two PT6A-20 turbines and can accommodate up to 21 passengers or 4,000 pounds of freight. Maximum takeoff weight of the early model and the series 200 is 11,597 pounds; the series 300 will carry 12,500 pounds. Production began in 1966 and increased from eight to ten a month in early 1969. Some 280 have been produced, a hundred of which have been delivered to North American commuter lines. The series 200 version introduced in 1968 featured a 70 percent increase in baggage space. Now in production is the series 300 version, with the more powerful PT 6A-27 turboprop engines and increased operating weights and performance.

In 1968 DeHavilland and Grumman Aircraft Engineering Corporation formed a joint program to market and produce a military version of the Twin Otter for potential U.S. military applications. Grumman is to be responsible for final assembly and delivery, and if enough order are generated the aircraft will be built in the United States.

In an effort to expand sales to the United States, DeHavilland and North American Rockwell Corporation surveyed the market potential of the Buffalo in the United States, with special emphasis on filling the new U.S. Government military requirement for the Light Intra Theatre Transport (LITT). This could lead to joint production, under license, of the Buffalo in the United States, with North American Rockwell responsible for marketing the aircraft to the U.S. military.

DeHavilland believes a version of its DHC-5 Buffalo turboprop STOL aircraft can be operated safely as an airliner and is seeking modification of the U.S. Federal Air Regulations to permit its use. The civil version would have a gross weight 3,000 pounds lighter than the military's 41,000 pound aircraft. The company expects the U.S. commuter airlines and third-level scheduled operator's demand for the series 200 Twin Otter and the follow-on 300 series to continue for at least 3 or 4 years. Beyond that, they anticipate continuing demand for the Twin Otter as a light STOL civil and military utility transport in many other countries.

For the future, DeHavilland has been working on a four engine STOL aimed at solving the problems of saturated air space and congested terminals. This latest endeavor is known as the DHC-7. Market research has been concentrated on U.S. trunkline and third-level carriers. DeHavilland hopes to receive enough orders to begin production, which would cost about $60-70 million.

The DHC-7 is not expected to cost any more to run than the conventional turboprop aircraft, and the STOL features should make it profitable on short flights that are not worthwhile with other aircraft. It will be powered by United Aircraft Ltd. engines and is projected to sell for about $1.7 million. If production begins in 1970, first flight would occur in late 1971 and deliveries would start in 1973. However,

as of February 1970 the airplane was still in development with no firm production plans.

Douglas of Canada

Douglas Aircraft Company of Canada was formed in December 1965, at which time it took over from DeHavilland the wing and empennage assembly work for all DC-9's. In a $10 million deal, Douglas received a 5-year lease on DeHavilland's Malton plant and in August 1968 exercised its option to purchase the land and buildings. The property will be expanded by construction of a new manufacturing building for basic DC-10 wing structure production.

After Douglas took over, production rates on wings and empennage were raised from one per week to four. Employment was raised from 2,400 to 4,000 and is expected to reach 8,000 by 1972. The fabrication of the DC-9 wings, tail sections, and other jetliner components amounts to US$225,000 to US$275,000 of Canadian added value per plane set. McDonnell Douglas hopes to sell in excess of 1,000 DC-9's, thus providing its Canadian subsidiary with over $225 million worth of export business. Furthermore, the DC-10 wing structures to be manufactured by the firm will approximate 15 percent of the total DC-10 manufacturing effort. The added value to the DC-10 components over the next 10 years has been estimated at $700 million to $1 billion.

Douglas of Canada is currently selling its U.S. parent company about $100 million worth of products a year, and this is expected to increase to $150 million by 1972.

The company's new $20 million expansion and facilities investment has put it in a position to compete with other aircraft firms on non-McDonnell Douglas work. The company now accounts for 40 percent of the Canadian aviation industry's total exports.

United Aircraft of Canada Ltd.

United Aircraft of Canada Ltd. (UACL) was formed in 1928 as Canadian Pratt & Whitney Aircraft. A subsidiary of United Aircraft of Hartford, Connecticut, the company adopted its present name in 1963. Initially UACL was primarily engaged in the manufacture and overhaul of Pratt & Whitney reciprocating engines and spares. Today the firm manufactures, overhauls, and markets many of the parent company's products. UACL is the sole producer of Pratt & Whitney piston engines and parts, servicing and rebuilding these engines for aircraft in 72 countries. This accounts for 40 percent of the company's business.

UACL designed and developed the PT6 gas turbine. This engine received civil certification in 1963 and by mid 1968 had gained over 80 percent of the power plant sales for light turboprop aircraft in the western world. This amounted to over 2,500 deliveries. By July 1968 over 4,000 engines had been produced. Production has now reached a rate of

100 engines a month, and almost 60 percent of the engines' contents are Canadian. PT6 sales and services account for 25 percent of the company's sales volume.

UACL recently developed the PT6-T3 Twin-Pac as a powerplant for the Bell Model 212, a twin-engined version of the UH-1 Huey series helicopter. Bell Helicopter Corporation has placed an order for 100 units. The advanced light turboprop PT6A-30 has been proposed to power the U.S. Army's new advanced surveillance aircraft (ASA).

Lockheed has placed a $20 million contract for an advanced version of the PT6, the ST6L, as an auxiliary power unit for the pneumatic and air conditioning systems of its Lockheed L-1011 300-passenger airbus.

UACL has delivered the first prototypes of its new Pratt & Whitney JT15D turbofan engine, designed to power small, executive, and military transports. The company expects civil certification and production by early 1971. Cessna Aircraft Company will power its new model 500 executive jet aircraft with the JT15D. The company has placed a $10 million order with UACL for the engine.

In addition to its engine activities, UACL does some helicopter production and assembly work, including work on the Sikorsky Sea King helicopters for the Royal Canadian Navy.

UACL has over 5,000 employees. Sales reached $120 million in 1967 and the company estimated a 25 percent increase in volume for 1968. Historically, more than 70 percent of United's business has been in export, with 50 to 55 percent of exports going to the United States.

Part 3. Import Duties and Taxes

Aircraft

The tariff on aircraft of a type and size made in Canada is 7½ percent ad valorem. Those of a type or size not made in Canada are admitted duty free under a regulation which has been extended from year to year and is currently in effect until July 1, 1971. In practice, however, all aircraft are currently permitted duty free entry, since Canadian Customs Memorandum D51-15-2, dated August 25, 1969, declared that "all aircraft are presently ruled of types or sizes not made in Canada." This situation can change from time to time as Canadian aircraft production capabilities change. Canadian customs gives a 30-day advance notice whenever a product is transferred from 'a type or size not made in Canada' to a 'type or size made in Canada' category with a resultant increase in duty.

Aircraft imported temporarily—for sales demonstration purposes to prospective customers, for crop spraying or firefighting, for work crews in isolated areas, or for any other purpose where other forms of transportation are precluded—are subject to duty and sales tax on a prorated basis of 1/20th of the value of the aircraft per month with a minimum levy of $25. In the present circumstances, the only assessment on the prorated value of the aircraft would be the 12 percent sales tax.

Under a long-standing customs provision, used or second-hand aircraft are prohibited entry into Canada except in special circumstances, including importations for Canadian Government use or importations by foreign governments having defense establishments in Canada. Import permits may also be granted in other circumstances, as for airplanes owned by new Canadian settlers, under special regulations issued by the Governor in Council.

Aircraft Engines and Parts

Aircraft engines are dutiable at 7½ percent unless of types or sizes not made in Canada, in which case duty free entry is permitted to July 1, 1971. Engine parts of types and sizes made in Canada are dutiable at 5 percent, while those of types and sizes not made in Canada are permitted free entry with no termination date.

Parts of aircraft of types and sizes made in Canada are dutiable at 7½ percent. Parts of types and sizes not made in Canada enter duty free on a permanent basis.

In 1965 Canada relaxed a restrictive provision which placed the TBO (time between overhaul) for U.S. repaired engines at the "basic time" level, thus discouraging potential Canadian customers by making engine operation costs unrealistically prohibitive. While the overhauls still have to be done to the stricter Canadian regulations, U.S. overhauls are accepted if they have been certified by a certified airworthiness representative as meeting Canadian standards.

Sales Tax

All aircraft, engines, and parts are subject to a federal sales tax of 12 percent, collected at the time of importation, on the duty-paid value. An importer may, under suitable circumstances, obtain a license which permits deferment of the payment of the sales tax until such time as the goods are sold. Provincial sales taxes range from 5 to 8 percent. Both the Federal and provincial sales taxes are general levies imposed on a wide range of goods whether imported or made in Canada.

Prior to 1966 the federal sales tax was also applied in the case of aircraft engines repaired in the United States and returned to Canada. The tax was on the full value of the engine unless the repair could not be done in Canada within a reasonable distance from point of shipment. The current practice is to levy the tax only on the value of the repair work done in the United States.

Ground Equipment for Servicing Aircraft

Effective September 17, 1969, the government of Canada remitted customs duties on machinery and equipment imported to service aircraft registered in a foreign country at international airports in Canada. The amount of sales tax due to difference between duty-paid value and value for duty has also been remitted. The Air Industries Association of Canada recently announced it will seek duty free status for aircraft and avionics assemblies shipped from the United States to Canada for assembly and return, in line with the same provisions that now apply to automobile parts.

Appendix

Definition of Group Numbers

Group I = Scheduled air carriers
Group II = Regular specific point air carriers
Group III = Irregular specific point air carriers (with annual revenues exceeding $100,000)
Group IV = Charter air carriers (with annual revenues exceeding $100,000)
Group V = Carriers having gross annual flying revenues of less than $100,000

Table 1.—Summary of the Canadian Civil Aircraft Register

(As of September 30, 1969)

	Commercial	Private	State	Experi-mental	Commercial restricted	Ultra-light	Private restricted	Total
Total aircraft on register as of June 30, 1969	3,009	6,535	203	18	93	410	31	10,299
Total aircrat on register as of Sept. 30, 1969	3,113	6,709	200	18	91	428	32	10,591
Total aircraft with valid C. of A. or flight permit	2,760	5,406	190	12	74	275	26	8,743
Aeroplanes	2,703	6,466	164	15	90	308	32	9,778
Helicopters	406	57	36	2	1	.....	.....	502
Gliders	4	178	....	.....	.....	44	.....	226
Gyroplanes	.....	3	....	1	.....	74	.....	78
Balloons	.....	5	....	.....	.....	2	.....	7
Single engine aircraft	2,437	5,989	123	10	84	382	28	9,053
Twin engine aircraft	545	524	71	7	4	.....	4	1,155
Multi-engine aircraft	128	12	6	1	3	.....	.....	150
Total aircraft under 4,001 lbs. gross weight	2,147	6,108	41	7	50	428	27	8,808
Total aircraft 4,001 lbs. to 12,500 lbs. gross weight	653	495	131	7	15	.....	2	1,303
Total aircraft 12,501 lbs. to 30,000 lbs. gross weight	84	68	13	2	21	.....	1	189
Total aircraft 30,001 lbs. to 100,000 lbs. gross weight	130	30	15	2	4	.....	2	183
Total aircraft over 100,000 lbs. gross weight	99	8	....	.....	1	.....	.....	108

Source: Dominion Bureau of Statistics, Canadian Department of Transport.

Table 2.—Canadian Air Carriers: Operating Statistics for Civil Aviation, 1968

	Jan.—Dec. 1968, Groups I-IV[1] (in thousands)	Percent increase from Jan.—Dec. 1967, Groups I-IV[1]
Unit toll traffic:		
Hours flow	485	8.3
Passengers carried	8,424	3.3
Passenger miles	7,525,282	8.5
Goods carried (lbs.)	295,103	19.8
Goods ton-miles	207,837	32.6
Unit toll revenues	$519,927	12.4
Bulk traffic:		
Hours flown	411	3.4
Passengers carried	861	8.9
Passenger miles	645,944	64.7
Goods carried (lbs.)	150,114	24.5
Goods ton-miles	18,065	35.5
Bulk transport revenues	$70,104	21.8
Total operating revenues	$614,084	13.0
Total operating expenses	$575,687	11.6

[1]See Appendix.

Source: Dominion Bureau of Statistics, Canadian Department of Transport, Air Transport Committee.

Table 3.—Specialty Services: Utilization and Revenues, Reported by All Canadian Carriers

Type of service	Revenue hours				Revenue earned				Revenue hours reported by Group V[1] carriers as a percent of total revenue hours reported by all carriers	
	No. of hours		Percent of total		$000		Percent of total			
	1966	1967	1966	1967	1966	1967	1966	1967	1966	1967
Flying training	279,186	353,388	61.5	64.8	6,462	8,052	41.2	41.4	64.1	58.9
Recreational flying	47,741	53,441	10.5	9.8	1,265	1,349	8.1	6.9	66.4	64.0
Aerial photography and survey	25,850	23,246	5.7	4.3	2,646	2,464	16.8	12,7	12.9	3.8
Aerial photography (scenics)	1.350	2,091	0.3	0.4	64	110	0.4	0.6	57.6	58.5
Aerial inspection, reconnaissance, and advertising	32,372	43,425	7.1	8.0	2,605	3,794	16.6	19.5	33.2	30.8
Aerial application and distribution	22,980	14,857	5.1	2.7	1,039	905	6.6	4.6	71.8	61.9
Aerial control	3,394	9,786	0.8	1.8	519	1,653	3.3	8.5	56.5	14.7
Aerial construction	369	600	0.1	0.1	135	130	0.9	0.7	39.6	15.0
Air ambulance and mercy services	29	72	(2)	(2)	3	6	(2)	(2)	48.3	30.6
Aircraft rental	40,348	44,297	8.9	8.1	958	986	6.1	5.1	57.8	55.0
Total	453,619	545,203	100.0	100.0	15.696	19,449	100.0	100.0	58.9	53.7

[1]See Appendix.
[2]Less than 0.5 percent.

Source: Dominion Bureau of Statistics, Canadian Department of Transport.

Table 4.—Canadian Commercial Air Carriers: Equipment as of January 15, 1969

Manufacturer	Model	Number
	Group A Fixed-Wing Aircraft	
Boeing	Fortress	1
	B707	2
	B727	1
	B737	7
Bristol	Freighter 170	6
Consolidated	Canso 28-5A	32
Convair	640	4
Curtiss Wright	C-46	1
Douglas	A-26	1
	DC-3	60
	DC-4	15
	DC-6	4
	DC-6B	5
	DC-7C	2
	DC-8-40 series	16
	DC-8-50 series	11
	DC-8-60 series	10
	DC-9-30 series	31
Fairchild	F-27	8
Grumman	Avenger	18
	Gulfstream G159	2
Handley Page	Dart Herald	3
Hawker Siddeley	DH-125	2
	748	1
Lockheed	Hercules 382	1
	Lodestar 18	6
	Super Constellation 1049	3
Martin	Mars	2
Nihon	YS-11	2
Vickers	Vanguard 950	23
	Viscount 700 series	38
Total		318
	Group B Fixed-Wing Aircraft	
Aero	Commander 500	1
	Commander 520	1
	Commander 600	3
	Commander 680	11
	Commander 1121	3
	Turbo Commander	1
Avro	Anson V	4
Barkley Grow	T 8P1	1
Beech	AT-11	2
	18	74
	Musketeer 23-24	11
	Debonair 33	2
	Bonanza 35	2
	Twin Bonanza 50	2
	Queen Air 65	1
	Queen Air 80	3
	King Air 90	1
	Travelair 95	13
Bellanca	Skyrocket 31-55	2
	Aircruiser 66-75	1
Boeing	Stearman 75	21
Britten-Norman	Islander BN21	1

Table 4.—Canadian Commercial Air Carriers: Equipment as of January 15, 1969—Continued

Manufacturer	Model	Number
	Group B Fixed-Wing Aircraft—Con.	
Callair	A-9	8
	B-1	3
Cessna	180	261
	182	14
	185	67
	188	2
	195	2
	205	1
	206	23
	210	6
	310	15
	320	3
	337	9
	402	4
	402	4
	411	2
	421	1
DeHavilland	Beaver DHC2	163
	Turbo Beaver DHC2	4
	Dove 104	2
	Heron 114	2
	Otter DHC3	58
	Twin Otter DHC6	10
Dornier	28	3
Fairchild	Husky F11	4
Found Bros.	FBA 2C	12
Grumman	Goose G21	13
	AG-Cat G 164	2
	Widgeon G44	5
	Mallard G73	3
Helio	Courier H391	1
	Courier H395	1
Lockheed	Electra 10 & 12	4
Howard Aero	Jobmaster DGA15	2
Mooney	MU-2	1
	M-21	1
Noorduyn	Norseman IV	8
	Norseman V	27
	Norseman VI	14
North American	Harvard	8
Navion	Ryan ST3	1
Piper	PA-23	116
	PA-24	4
	PA-25	16
	PA-28	2
	PA-30	7
	PA-31	4
	PA-32	3
Republic	Seebee RC3	2
Scottish Aviation	Twin Pioneer	1
Snow	Commander 600S2	8
Stinson	SR 9 & 10	3
	Reliant V77	1
United Consultants	Twin Bee UC 1	1
Waco	Siai Marchetti	2
Total		1,101

Table 4.—Canadian Commercial Air Carriers: Equipment as of January 15, 1969—Continued

Manufacturer	Model	Number
	Group C Fixed-Wing Aircraft	
Aero	Commander 100	3
Aeronca	Sedan 15	4
Alon	Aircoupe A2	2
Beech	Musketter 23	1
Inco	Call Air A9	1
Cessna	120	1
	140	7
	150	337
	170	5
	172	188
	175	4
	177	9
	305	1
Champion	Traveller 7	54
	Lancer 402	1
Fleet	Canuck 80	30
Forney	Ercoupe 415	2
Lake Aircraft	Skimmer LA4	1
Muscombe (Silvaire)	Observer 8	4
Maule	Beedee M 4	2
Piper	PA-11	5
	PA-12	21
	PA-16	1
	PA-18	70
	PA-22	47
	PA-25	5
	PA-28	160
	J-3	14
Stinson	Voyager 108	6
Taylorcraft	BC-12	1
Total		987
	Helicopters	
Group B:		
Bell	204	10
Sikorsky	S-55	2
	S-58	1
Sud-Aviation	Alouette 2	12
	Alouette 3	1
Boeing Vertol	42 A	3
	42B	1
Group B—Total		40
Group C:		
Bell	206A	21
	47	197
Brantley	B-2	2
	305	1
Hiller	UH-12	32
	FH-1100	19
Hughes	269	7
	300	5
Group C—Total		284
Groups B and C—Total		324

Source: Dominion Bureau of Statistics, Canadian Department of Transport.

Table 5.—Canadian Commercial Air Carrier Fleet by Type of Power Plant

Year	Total A/C in fleet	Fixed-wing aircraft				Helicopters		
		Turbo jet	Turbo propr	Piston engine	Total	Turbine	Piston	Total
1960 . .	1,630	3	58	1,444	1,505	. . . . .	125	125
1964 . .	2,043	20	79	1,726	1,825	1	217	218
1965 . .	2,157	21	75	1,801	1,897	5	255	260
1966 . .	2,371	29	77	1,971	2,077	14	280	294
1967 . .	2,605	40	80	2,155	2,275	23	307	330
1968 . .	2,763	70	94	2,255	2,419	60	284	344
1969[1] . .	2,730	83	96	2,227	2,406	63	261	324

[1]Figures for 1969 are as of January 15, 1969; all other years are as of July 16.

Source: Dominion Bureau of Statistics, Canadian Department of Transport.

Table 6.—Hours Flown by Canadian Commercial Air Carriers, Groups I-V, by Type of Service and Percentage Change, 1960-67

Year	Service hours					
	Unit toll	Percent increase	Bulk	Percent increase	Specialty flying	Percent increase
1960	383,181	Base year	289,113	Base year	173,555	Base year
1961	327,555	-14,5	313,225	8.3	184,643	6.4
1962	312,395	-4.6	306.324	2.2	186,127	0.8
1963	298,655	-4.4	332,131	8.4	201,855	8.5
1964	300,798	0.7	377,246	13.6	234,288	16.1
1965	335,379	11.5	431,269	14.3	317,580	35.6
1966	376,783	12.3	481,722	11.7	453,619	42.8
1967	447,599	18.8	509,978	5.9	545,203	20.2
Total percent change 1960-67	. . . . .	16.8	. . . . .	76.4	. . . . .	214.1

Source: Dominion Bureau of Statistics, Canadian Department of Transport.

Table 7.—Canadian Civil Aircraft Reporting Flying Hours in 1967

Province	Fixed wing		Rotary wing		Total	
	Number	Hours flown	Number	Hours flown	Number	Hours flown
British Columbia . . .	1,086	356,086	82	38,979	1,168	395,065
Alberta	855	189,725	69	35,216	924	224,941
Saskatchewan	636	103,432	13	5,449	649	108,881
Manitoba	599	138,465	10	4,145	609	142,610
Ontario	2,342	500,250	113	50,809	2,455	551,059
Quebec	869	526,324	55	20,871	924	547,195
New Brunswick	100	24,001	4	2,243	104	26,244
Nova Scotia	69	13,724	2	334	71	14,058
Prince Edward Island	16	1,913			16	1,913
Newfoundland	80	37,246	2	1,195	82	38,441
Northwest Territories	58	15,196			58	15,196
Yukon	41	9,440	16	10,531	57	19,971
Total	6,751	1,915,802	366	169,772	7,117	2,085,574

Source: Canadian Department of Transport.

Table 8.—Canadian Private Aircraft Reporting Flying Hours in 1967

Province	Fixed wing		Rotary wing		Total	
	Number	Hours flown	Number	Hours flown	Number	Hours flown
British Columbia . . .	748	132,857	15	3,337	763	136,194
Alberta	680	107,128	4	1,349	684	108,477
Saskatchewan	481	50,100	3	138	484	50,238
Manitoba	416	47,540	2	261	418	47,801
Ontario	1,669	219,387	11	3,068	1,680	222,455
Quebec	448	68,806	23	3,596	471	72,402
New Brunswick	68	11,162	1	1,130	69	12,292
Nova Scotia	45	5,384	1	196	46	5,580
Prince Edward Island	15	1,655			15	1,655
Newfoundland	31	5,864			31	5,864
Northwest Territories	32	3,486			32	3,486
Yukon	27	3,299	2	923	29	4,222
Total	4,660	656,668	62	13,998	4,722	670,666

Source: Canadian Department of Transport.

Table 9.—Canadian Airports With Radio Landing Aids or Runway Over 4,000 Feet Long

Province	Hard surface, control tower with radio landing aid	Hard surface	Sod, gravel with running lights	Sod, gravel	Seaplane
Alberta	4	6	6	10	.....
British Columbia	8	15	2	7	3
Manitoba	5	7	1	1	.....
New Brunswick	4	2	1	.....	.....
Newfoundland	5	4	.....	2	2
Nova Scotia	4	2	.....	.....	1
Northwest Territories	.....	6	26	8	5
Ontario	10	24	3	2	2
Prince Edward Island	.....	.....	.....	.....	.....
Quebec	7	22	6	13	2
Saskatchewan	3	5	.....	2	.....
Yukon	1	1	5	2	.....
Total	51	94	50	47	15

Source: BDSA/U.S. Department of Commerce.

Table 10.—U.S. Aerospace Exports to Canada

U.S. Tariff Schedule B number	Schedule B category	1969		1968		1967		1966	
		Number	Value ($000)	Number	Value ($000)	Number	Value ($000)	Number	Value ($000)
7114120	Internal combustion engines, new aircraft, under 500 hp	262	954	89	367	154	468	144	451
7114130	Internal combustion engines, new aircraft, 500 hp and over	7	354	14	1,127	27	375	18	382
7114140	Internal combustion engines, used aircraft	148	1,360	130	1,258	124	905	115	797
7114160	Internal combustion aircraft engine parts, n.e.c.	.....	17,528	.....	18,419	.....	22,586	.....	24,510
7114220	Turbines, utility, and gas aircraft, nonmilitary	121	10,870	110	12,879	83	8,290	70	6,644
7114230	Aircraft turbine parts, n.e.c.	.....	31,141	.....	27,818	.....	22,020	.....	16,872
7249970	Electronic navigational aids	.....	26,156	.....	10,005	.....	9,008	.....	7,663
7294130	Spark plugs, aircraft type	138,819	386	140,971	345	.....	.....	.....	.....
7341010	Aircraft, personal, utility, single engine, new	356	5,018	404	4,887	405	4,640	364	4,000
7341015	Aircraft personal, multi-engine under 3,000 lbs.	9	412	16	500	11	585	7	185
7341020	Aircraft, personal, multi-engine 3000 lbs. and over	53	7,488	37	4,927	62	9,065	64	5,310
7341025	Aircraft, rotary wing, under 2,000 lbs.	47	2,976	41	2,927	42	2,936	38	1,562
7341030	Aircraft, rotary wing, 2,000 lbs. and over	14	3,580	2	71	2	387	15	2,535
7341035	Aircraft, passenger transport, under 33,000 lbs.	6	7,832	3	4,684	2	1,144	.....	.....
7341040	Aircraft, cargo transports, n.e.c. under 33,000 lbs., empty airframe weight, non-military, new	.....	.....	.....	.....	.....	.....	1	30
7341045	Aircraft, passenger-cargo combination, under 33,000 lbs.	.....	.....	1	1,868	.....	.....	.....	.....
7341050	Aircraft, passenger transport, 33,000 lbs. and over	14	91,853	37	185,261	15	71,954	8	35,256

Table 10.—U.S. Aerospace Exports to Canada (Continued)

U.S. Tariff Schedule B number	Schedule B category	1969		1968		1967		1966	
		Number	Value ($000)	Number	Value ($000)	Number	Value ($000)	Number	Value ($000)
7341055	Aircraft, cargo transports, n.e.c., 33,000 lbs. and over, empty aircraft weight, nonmilitary, new	.....	.....	.....	.....	1	2,207	.....	.....
7341060	Aircraft, passenger-cargo combination, 33,000 lbs. and over	1	8,809	.....	.....	.....	.....	1	7,434
7341062	Aircraft, n.e.c. nonmilitary, new	7	10	10	121	4	86	2	23
7341065	Aircraft, used, rebuilt, or converted, nonmilitary	191	25,278	144	1,840	143	16,058	129	2,003
7349120	Airships and balloons, nonmilitary	4,157	210	10,931	255	8,264	259	28,493	179
7349210	Propellers and parts, n.e.c., for aircraft	.....	5,775	.....	6,535	.....	5,672	.....	3,508
7349220	Landing gear and parts for aircraft	.....	5,372	.....	4,283	.....	3,505	.....	3,079
7349230	Parts and accessories, n.e.c., for aircraft	.....	51,631	.....	52,168	.....	49,386	.....	35,744
8619110	Aircraft flight instruments	.....	11,261	.....	6,038	.....	4,603	.....	4,751
8619720	Aircraft engine instruments for measuring, etc.	.....	1,314	.....	1,341	.....	2,014	.....	993
8619935	Parts, etc., n.e.c., for aircraft engine instruments	.....	1,509	.....	1,776	.....	1,328	.....	.....
	Grand Total	.....	$319,127	.....	$351,018	.....	$241,349	.....	$163,911

Source: U.S. Bureau of the Census.

Table 11.—U.S. Imports of Canadian Aerospace Products

TSUSA number	TSUSA category	1969		1968		1967		1966	
		Number	Value ($000)	Number	Value ($000)	Number	Value ($000)	Number	Value ($000)
6604415	Piston type aircraft engines other than compression ignition	11	277	7	97	45	30	53	110
6604620	Aircraft, turbo-jet and gas turbines, new	633	9,172	315	10,467	312	8,024	1,908	11,002
6604640	Nonpiston type aircraft engines, n.e.c.	297	4,054	158	5,030	71	1,039	58	908
6941500	Balloons and airships	.....	.....	.....	.5	.....	.....	.....	4
6942000	Gliders	.....	.....	.....	1	.....	6	.....	.....
6943000	Kites and parts thereof, aircraft and spacecraft	.....	.....	.....	2	.....	17	.....	.....
6944010	Airplanes, military	15	1,541	12	358	22	1,691	33	11,188
6944020	Airplanes, nonmilitary, used or rebuilt	12	1,753	21	26,737	17	1,277	6	3,177
6944030	Airplanes, nonmilitary, rotary wing, new	.....	.....	.....	.....	2	8	.....	.....
6944040	Airplanes, nonmilitary, new, under 10,000 lbs. empty weight	16	4,449	19	5,822	13	5,136	10	3,190
6944050	Airplanes, nonmilitary, new, 10,000-30,000 lbs. empty weight	45	15,142	38	12,114	8	2,830	1	74
6944060	Airplanes, nonmilitary, new, over 33,000 lbs. empty weight	1	2,789	3	5,585	4	1,038	.....	.....
6946000	Air- and Spacecraft parts, n.e.s.	.....	122,442	.....	134,037	.....	155,159	.....	91,147
6947000	Parachutes and parts	.....	250	.....	917	.....	863	.....	7
	Grand total		$161,869		$201,167		$177,118		$120,807

Source: U.S. Bureau of the Census.

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